URS

1–8 College Yard, Kentish Town

Environmental Sustainability Statement

July 2014

Prepared for:
Peaceline Ltd

UNITED KINGDOM & IRELAND

REVISION SCHEDULE					
Rev	**Date**	**Details**	**Prepared by**	**Reviewed by**	**Approved by**
V1	17th June 2014	Draft for comment	James Wrixon	Gill Smith	Gill Smith
V2	04th July 2014	Final	James Wrixon	Gill Smith	Gill Smith

URS Infrastructure and Environment UK Limited
Scott House
Alençon Link
Basingstoke
Hampshire
RG21 7PP

Tel: 01256 310200
Fax: 01256 310201

TABLE OF CONTENTS

1 INTRODUCTION

The principles of "Sustainable Development" are addressed by legislation and policy at all levels of government, and are widely recognised as a fundamental consideration for all current and future development. The National Planning Policy Framework (NPPF) came into effect on 27th March 2012 and introduced a presumption in favour of sustainable development. This Environmental Sustainability Statement considers the environmental dimension of Sustainable Development.

This Environmental Sustainability Statement and Code for Sustainable Homes (CfSH) Pre-Assessment has been produced to accompany the detailed Planning Application for the Kentish Town 1-8 College Yard development (hereafter referred to as the 'proposed development'), in accordance with the Site Layout, a copy of which is contained in Appendix 1.

1.1 The Application Site[1]

The site is located within Kentish Town, an urbanised area within the London Borough of Camden. The site is c.512m^2 in size and makes up the majority of an area called 'College Yard'. The site currently comprises a single dis-used commercial building, while the wider College Yard site also includes a car repair workshop.

The site does not included any landscaped or amenity areas, however the northwest and northeast façades of the building form the boundary walls to adjacent residential gardens and subsequently have become colonised by garden plants to form pseudo green walls.

There has been no employment use within the site for at least 4 years and prior to that the building was used for storing theatre stage sets and costumes. Subsequently the building is in a poor state of repair, and the fabric and structure of the building are in poor decay, for example the roof is

[1] Martin Evans Architects (2013) *Design and Access Statement, 1-8 College Yard*

leaking, plants and trees are growing inside, and the building suffering from damp.

The site is fully enclosed by existing development, being bounded by the rear aspects of residential uses which front onto Lady Somerset Road, Evangelist Road, and Burghley Road, and residential and commercial uses which front onto Highgate Road.

The site is accessed from College Lane which runs from Lady Somerset Road to the B518 Highgate Rd. For the most part College Lane is an alleyway which acts as a service route to the rear of the properties that back onto it however at its southern end, where it connects to Highgate Rd, it is wide enough to accommodate and provide vehicular access to the College Yard site.

Highgate Road is a busy thoroughfare and most of the buildings on the road have commercial or retail uses at the ground floor with some residential use on the upper floors. Lady Somerset Road is a residential road which includes traffic calming measures and on-road permit parking.

1.2 The Proposed Development

The proposed development is to demolish the existing dis-used commercial building within College Yard with the exception of the north-west facing façade which is to be retained in situ as a green wall.

The proposed development comprises one end terrace and three mid-terrace 3-bedroom dwellings, and two end-terrace 2-bedroom town houses. Each of the proposed dwellings front onto College Lane and have waste storage areas adjacent to their entrances. The building itself is three stories high and semi-sunken so that it comprises a lower ground floor, an upper ground floor, and a first floor.

Amenity space for each of the 3-bedroom dwellings comprises a private roof terrace and a winter garden with glass roof. Amenity space for the 2-bedroom town houses comprises a private terrace each.

Each dwelling will be provided with one secure vertical bicycle locker[2]. Onsite car parking provision is not proposed for the new dwellings, and service / emergency vehicle access will use the existing College Yard access arrangements (i.e. via the southern wider section of College Lane which joins Highgate Rd).

1.3 National Planning Policy

The National Planning Policy Framework (NPPF) came into effect on 27th March 2012 and reformed the UK planning system, replacing the vast majority of the UK Planning Policy Statements (PPS) and Planning Policy Guidance (PPG). The NPPF states that, from the 27th March 2013, *"due weight should be given to relevant policies in existing plans according to their degree of consistency with this framework (the closer the policies in the plan are to the policies in the Framework, the greater the weight that may be given)"*[3].

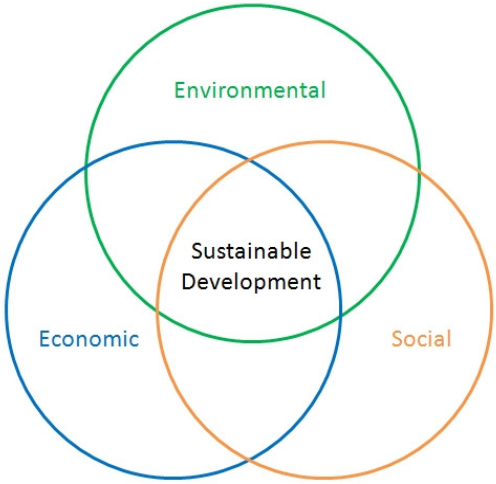
At the heart of the NPPF is a presumption in favour of sustainable development which, it states, should be seen as a golden thread running through both plan-making and decision-taking[4]. The NPPF states that there are three dimensions to sustainable development: economic, social and environmental, and that these dimensions give rise to the need for the planning system to perform a number of roles[5]:

- An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth

[2] GML Architects (2014) Proposed Site Layout – Upper Ground Floor. Drawing Number 4129/P/011
[3] DCLG (2012) *National Planning Policy Framework*. Paragraph 215 – Implementation
[4] DCLG (2012) *National Planning Policy Framework*. Paragraph 14 – The Presumption in Favour of Sustainable Development
[5] DCLG (2012) *National Planning Policy Framework*. Paragraph 7 – Achieving Sustainable Development

and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

- A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and supports its health, social and cultural well-being; and
- An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and as part of this, helping to improve biodiversity, use natural resources prudently, minimise water and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.



This report has been prepared to address the environmental dimension of sustainable development, and the elements of the NPPF which relate to environmental sustainability are evaluated within the associated sections of this statement. The most recognised element of environmental sustainability is climate change. The NPPF (paragraph 93) states – *"planning plays a key role in helping shape places to secure radical reductions in greenhouse gas*

emissions, minimising vulnerability and providing resilience to the impacts of climate change".

The second element of paragraph 93 of the NPPF relates to supporting the delivery of renewable and low carbon energy and associated infrastructure. This is elaborated upon within paragraphs 97 and 98, which aim to address issues surrounding such items as wind farms, biomass and bio-fuel processing factories and energy from waste incineration plants, which are not relevant to the proposed development.

With regard to Planning Authorities setting sustainability targets for development, the NPPF (paragraph 95) states – "*when setting any local requirements for a building's sustainability, do so in a way that is consistent with the Government's zero carbon buildings policy and adopt nationally described standards*".

At the end of 2010, the Government announced the need for a review of housing standards as applied through the planning system. The objective was to propose ways in which the bureaucracy, duplication and complexity of local and national standards surrounding local house building processes could be simplified, and to help reduce development costs.

The Code for Sustainable Homes (CfSH) was cited as one of the standards for inclusion in the review. Final agreement was reached on the arrangements for the Local Housing Delivery Group (LHDG) in June 2011, and work started in September. The Group was Chaired by Sir John Harman, and supported by the Local Government Authority (LGA), Housing Builders Federation (HBF), and National House Building Council (NHBC).

The LHDG reported in June 2012. The broad conclusion was that there is significant scope for simplification of the standards regime. The key recommendation was for an urgent Government backed review and consolidation of existing local housing standards and CfSH to ensure they meet the aspirations of local communities without undermining viability.

As a result, the Government announced the Housing Standards Review Group (HSR) in October 2012. This group aligns with a broader Government commitment to rationalise the overall regulation burden across many sectors through the 'Red Tape Challenge', and the review of Planning Policy Guidance under Lord Taylor.

Both the LHDG and the HSR were timed to coincide with the expiry of the contract between Government and Building Research Establishment (BRE) Global covering operation and technical support for the CfSH.

The results were reported to ministers in Spring 2013 and the Government published the Housing Standards Review consultation document in August 2013. This announced that Building Regulations and Nationally Described Standards would cover the technical and functional performance of a building whilst planning policies will cover the environment (from the front door outwards) in which the building is built.

On 13th March 2014, the outcome of the Housing Standards Review was published along with a Written Ministerial Statement from the Department for Communities and Local Government (DCLG) which says:

> *"the Government has decided that the most sensible way forward is for any necessary technical standards as far as possible to be consolidated into the Building Regulations and the accompanying Approved Documents In the light of this, the Government thinks that the current Code [for Sustainable Homes] will need to be wound down" and that "planning authorities should only use the standards emerging from the review process".*

Also in March 2014, the DCLG launched the National Planning Practice Guidance (NPPG)[6] to support the NPPF, and elaborated on NPPF

[6] DCLG (2014) Planning Practice Guidance. Available at: http://planningguidance.planningportal.gov.uk [Accessed 06.06.14].

paragraph 95 stating *"Planning authorities will need to take account of Government decisions on the Housing Standards Review"*[7].

1.4 Regional Planning Policy

The London Plan 2011 is the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over a 20–25 year period. The elements of the London Plan which relate to environmental sustainability are evaluated within the associated sections of this statement.

1.5 Local Planning Policy

The proposed development lies within the jurisdiction of the London Borough of Camden (LBC) Planning Authority. The LBC Local Plan comprises of the Camden Core Strategy 2010-2025, and the Camden Development Policies 2010-2025. The elements of Camden's Local Plan which relate to environmental sustainability are evaluated within the associated sections of this statement.

1.6 Structure of this Statement

This Environmental Sustainability Statement has been produced by the URS Commercial Environmental Sustainability Team. Our depth of environmental understanding and the breadth of planning experience means we are ideally skilled to produce this Environmental Sustainability Statement to accompany the detailed planning application for the proposed development.

Environmental sustainability considerations have been developed for each of the elements within the statement (Sections 2-7). These incorporate aspects included in the design of the proposed development, measures for contractors involved in the construction of the development, and initiatives

[7] DCLG (2014) NPPG, Climate Change. Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/climate-change/what-are-governments-national-standards-for-a-buildings-sustainability-and-for-zero-carbon-buildings [Accessed 06.06.14].

relating to the eventual management and operation of the completed development.

The sections of this statement are structured as follows:

- An introduction to the relevance of the topic;
- Context including: NPPF and the best practice set out within it; local adopted policies consistent with NPPF; and guidance provided within national and local supporting documentation such as SPDs;
- Environmental sustainability considerations; and
- Summary.

1.7 Scope of Works

The URS team has exercised due and customary care in producing this Environmental Sustainability Statement, but has not, save as specifically stated, independently verified information provided by other qualified professionals. No other warranty, expressed or implied, is made in relation to the conduct of the contents of this report. Therefore URS assumes no liability for any loss resulting from errors, omissions or misrepresentations made by others.

2 ENERGY AND CARBON DIOXIDE

2.1 Introduction

Fuel poverty and emissions associated with the use of energy are well established issues. For a time it was considered good practice for buildings to mitigate for carbon emissions by prioritising the generation of onsite energy from low carbon and/or renewable sources. As time has progressed scientific understanding has advanced and technology has changed, and subsequently so too has opinion on best practice and planning policy.

This is reflected in the Government's Zero Carbon Buildings Policy which has been, and continues to be, implemented through the nationally adopted standards set out in Part L of the Building Regulations. Building Regulations 2013 Part L encourages a fabric first approach. The Zero Carbon Hub defines fabric first as focusing on improving the thermal performance of the building fabric, which the Energy Saving Trust says future proofs reductions in CO_2 emissions for the life of the building. To support this, the Government has invested considerable funds into research projects which are aimed at enhancing dwellings efficiency even further.

The following section provides a context review of key energy policies, followed by environmental sustainability considerations that are relevant to the proposed development.

2.2 Policy Context

2.2.1 *National*

The National Planning Policy Framework (NPPF) states that in determining planning applications, local authorities should expect new developments to take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

In March 2014 the Government issued a supporting note to the Ministerial Statement on the Housing Standards Review which clarified their position on

the practice of Planning Authorities imposing on development specific energy and/or CO_2 emissions reductions targets which exceed Building Regulations requirements, stating:

> *"We propose a "Building Regulations only" approach, with no optional additional local standards in excess of the provisions set out in Part L of the Regulations"*[8].

This position has been incorporated into the Deregulation Bill, which has completed its Committee Stage in the House of Commons. The Bill proposes an amendment to the Planning and Energy Act 2008, the intent of which is summarised below[9]:

> *"The Planning and Energy Action 2008 allows local planning authorities to require that buildings meet higher energy performance standards than those set out in building regulations. The new clause inserted by this amendment disapplies this for dwellings in England, as Government policy is that all such requirements should be set out in building regulations".*

2.2.2 *Regional*

The London Plan 2011 (Policy 5.2) states that development proposals should make the fullest contribution to minimising CO_2 emissions in accordance with the following energy hierarchy:

1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energy

[8] DCLG (2014) Technical Housing Standards Review – Ministerial Statement Supporting Note
[9] www.parliment.uk Deregulations Bill: Notice of Amendments 13th March 2014 http://www.publications.parliament.uk/pa/bills/cbill/2013-2014/0162/amend/pbc1621303a.57-60.html [Accessed 06.06.14]

Policy 5.2 also states that major developments should reduce their carbon emissions by 40% (below the 2010 Building Regulations Target Emissions Rate).

The Sustainable Design and Construction SPG provides guidance on Policy 5.2, saying that development should consider the use of natural systems (such as wind, sun and shading) to aid in reducing energy consumption. The SPG also encourages developers to incorporate energy monitoring equipment to enable occupiers to monitor and reduce their energy use.

The London Plan (Policy 5.6) states that new development should evaluate the feasibility of Combined Heat and Power (CHP) systems.

The London Plan also contains a policy (5.7) which expects major development to reduce CO_2 emissions through the use of renewable energy technology.

2.2.3 *Local*

The Camden Local Plan (Policy CS13) reflects the London Plan and requires the same energy hierarchy to be followed.

The Camden Housing SPG provides guidance on Policy CS13, saying that housing development should incorporate passive solar gain.

The Camden Sustainability SPG provides further guidance on Policy CS13, saying that developments should investigate the provision of community heating networks and on-site renewable technology. SPG's can expand on policy but not go beyond them or introduce new policies. The Sustainability SPG also says that developments are to target a 20% reduction in CO_2 emissions from renewable energy technology, thereby introducing aims beyond those set out in the original policy. Furthermore prioritising green energy does not comply with the London Energy Hierarchy.

The Camden Development Policies document (Policy DP22) says development proposals should consider appropriate climate change adaptation such as summer shading, and also expects new housing development to meet Code for Sustainable Homes Level 4 standards.

2.3 Reduce Energy Use (Be Lean)

2.3.1 *Passive Design*

Natural Systems

A development's layout and the orientation of its building orientations can have an impact on its energy consumption due to the interactions of the buildings with natural systems such as passive solar heat gain and natural daylight.

Glazing allows natural daylight to enter a building which can reduce the need for artificial lighting. However, glazing also allows solar heat penetration which, during periods of hot weather, could lead to the overheating of internal spaces and the use of mechanical ventilation or cooling. Furthermore glazing generally has higher U values than standard opaque constructions which, during periods of cold weather, could lead to the increased use of mechanical heating (see Section 2.3.2 for further details and measures taken to improve building fabric). The direction of glazing also has to be taken into account and ideally large areas of glazing should face northwest through southeast or be protected with some form of shading. These factors mean that it is important to design areas of glazing carefully to ensure that energy consumption is minimised.

The design for each of the 3-bedroom dwellings incorporates glazing into the front southwest and rear northeast facades of the terrace building, as well as a rooflight in each of their upper floor bedrooms. The two town houses are located at the southern end of the terrace building allowing both dwellings to benefit from an additional external southeast facing facade into which glazing has been incorporated.

The glazing which faces northeast has little risk of overheating due to the movement of the sun as experienced within the UK. The glazing on the southwest façade faces onto College Lane, a pedestrian alleyway. The two-three storied buildings on the opposite side of the lane (which is approximately 3m in width) will reduce the risk of the glazing causing the dwelling to overheat as they will provide a degree of shading.

The Government approved method of calculation for a dwelling's energy performance is called the Standard Assessment Procedure (SAP). Design stage SAP assessments have been produced for the proposed dwellings which show that the dwellings are not considered to be at risk of overheating.

Each of the 3-bedroom dwellings also incorporates a winter garden within the lower ground floor, which comprises opaque wall construction and a glass roof. The name suggests that winter gardens are designed primarily to be used for recreation / relaxation purposes during the winter and not as a main room in the summer. Therefore if they overheat in the summer it is not a major issue and do not require artificial cooling.

2.3.2 *Building Envelope*

Thermal Efficiency

A U-value is a measurement of how much heat is transferred through a material or element (e.g. a wall, floor or roof). Each material has a heat transfer co-efficient, the higher the coefficient for a particular material, the more rapidly heat can be transferred through that material. Insulation can be used to lower U-values for building elements, and thereby reduce the amount of heat lost or gained through the building envelope and subsequently reducing the heating and cooling demand of the building.

The proposed development has targeted U-values which exceed those set out in the current Building Regulations. The U Values targeted are set out in

Table 2.3.2 along with the Building Regulations requirements for comparison.

Table 2.3.2: U Values

Element	Nationally Adopted Standards	Targeted U Value (the lower the coefficient the better the performance)
Windows, roof windows, glazed roof lights, and pedestrian doors	2.00 W/m^2.K	1.3 W/m^2.K
Roof	0.20 W/m^2.K	0.12 W/m^2.K
External Walls	0.30 W/m^2.K	0.2 W/m^2.K
Floor	0.25 W/m^2.K	0.12 W/m^2.K
Party Wall	0.20 W/m^2.K	0 W/m^2.K

Air Movement

Air Leakage is the uncontrolled movement of air leaking out of and into a building. It is claimed that poor air tightness can be responsible for up to 40% of heat loss from buildings. Air leakage is measured as air permeability, which is the quantity of air (in m^3) that leaks into or out of the dwelling per hour, divided by the internal area (in m^2) of the building fabric at pressure of 50 Pascals (Pa). The mandatory requirement for air tightness has been set in the Building Regulations 2013 Part L at 10 m^3/h.m^2 at 50 Pa. The design team are committed to providing a greatly improved air permeability of 4m^3/h.m^2 at 50 Pa. for the proposed development[10].

2.3.3 *Efficient Equipment*

Once the opportunities presented by the site, the design and the building envelope have been fully explored, the next stage is to consider the efficiency of the equipment specified to operate the building. Probably the most energy intensive equipment is that used to provide heating and hot

[10] Correspondence with GML Architects dated 10.06.14

water and therefore this is a key area to consider. The next energy intensive area to consider is the lighting. The current recommendations include:

- High efficiency gas boilers with time and temperature control zones;
- Mechanical Ventilation Heat Recovery (MVHR) technology to capture heat within exhaust air for treat incoming cold air;
- All light fittings within the dwellings to be compatible with low energy light bulbs;
- Low energy external light fittings controlled by daylight sensors and/or time switches; and
- The provision of internal drying lines as an alternative option for occupants instead of a washer dryer.

2.3.4 *Energy Efficient Operation and Monitoring*

The way a building is operated by its occupants has an impact on the buildings energy use and associated CO_2 emissions. Reducing the energy use can be assisted by having an informed occupier who has been supplied with the equipment, knowledge and tools necessary for them to take positive action. To facilitate this the proposed development should consider the following technology:

- Energy Display Devices to display real time energy consumption data, thus empowering dwelling occupants to reduce energy use;
- Thermostatic Radiator Valves (TRVs) to reduce the flow of water through the radiator when the temperature rises above a certain setting to prevent overheating; and
- Building User Guides to allow the occupants or to make informed decisions when purchasing white goods, operating heating controls and undertaking repairs within the dwelling.

2.4 Mitigate for Energy Use (Be Clean and Be Green)

For a time it was considered good practice for buildings to reduce carbon emissions by prioritising the onsite generation of energy from low carbon and/or renewable sources, and subsequently planning policies developed to reflect this (for example the 'Merton Rule' and Regional Spatial Strategies).

As time has progressed scientific understanding has advanced and technology has changed, and subsequently so too has opinion on best practice and this is reflected in the NPPF, the Government's Ministerial Statement to the Housing Standards Review, and the proposed Deregulation Bill (see Section 1.4 and 2.2.1). The change in attitudes towards energy minimisation can be considered in the same vein as that for waste recycling. The primary emphasis used to be on recycling waste, however it is now understood that it is far better for the environment, and the economy, not to create waste in the first place rather than apply a tail-end solution of merely recycling where possible. Attitudes and policies to energy (and associated carbon emissions) have evolved in the same way and it is now considered best practice to consume less energy in the first place (see Section 2.3), rather than mitigate for the use by generating some of the residual energy onsite.

2.4.1 *Existing District Energy Schemes*

A review of the Department of Energy and Climate Change's (DECC) online UK CHP Development Map has found that there are no community heating systems or thermal power stations within the vicinity of the proposed development which the dwellings could be connected to[11].

2.4.2 *Creating District Energy*

Generally district heating schemes are managed by an Energy Supply Company (ESCo) who also manage the maintenance and customer

[11] DECC [Accessed 11.06.14] UK CHP Development Map http://chp.decc.gov.uk/developmentmap/

invoicing and payment. District Heating Schemes generally require a substantial and consistent demand for heat and electricity and can only be used on networks which contain sufficient balanced loads across a day, month and year to enable them to operate efficiently. They also require high density so that the distance the heat has to travel is minimised. The developments that meet these criteria are generally high rise residential developments that are combined with substantial quantities of retail, office and employment space, as they are compact and balance heat and power needs. With only six dwellings the proposed development does not meet the criteria for a district heating scheme.

2.4.3 *Combined Heat and Power (CHP)*

CHP plant is a mini power station supplying hot water and electricity. A turbine drives an alternator and the resulting electricity can be used either wholly or partially on-site. Heat produced during power generation, which would normally be wasted, is absorbed by coolant water through a high efficiency heat exchanger. The hot water is then usable directly for central heating, hot domestic water, or indirectly for air conditioning.

Similarly to District Heating Schemes (which often incorporate of CHP technology) site-wide CHP schemes require a substantial and consistent demand for heat and electricity and can only be used on developments which contain sufficient balanced loads across a day, month and year to enable them to operate efficiently. The proposed development does not meet these criteria, comprising only six dwellings and no other uses, and therefore CHP is not considered viable.

2.4.4 *Biofuel*

The most common forms of biofuel are wood pellets, chips or logs. Biofuel is considered a low carbon option as the CO_2 emitted when burned is the same amount that the plant absorbed over the months and years that it was growing. This is providing there are sufficient new plants grown in place of

those used as fuel. Another form of biofuel is biodiesel which is a blended form of oil made from vegetable oil crops e.g. rapeseed, soya, palm oil, through a process known as transesterification.

Biofuel can be used to fuel individual or district CHP systems however, as discussed, CHP technology is not considered to be viable for the proposed development.

Biofuel can also be used to fuel open fires and individual or district hot water systems. However to facilitate the use of Biofuel a large plant room is required for the equipment and the storage of fuel. The plant room must be capable of holding sufficient fuel for peak loads and bank holidays and other periods where deliveries may be challenging (e.g. between Christmas and New Year). Furthermore the combustion of biofuel releases nitrous oxides which contribute to air quality pollution in heavily urbanised and potentially lead to public health issues if located nearby to residential properties (see Section 4.3.2 for further details).

This large space requirement of biofuel, and the potential air quality and public health issues resulting from the site's location in a residential area of central London, mean that the use of biofuel is not considered viable for the proposed development.

2.4.5 *Photovoltaic Panels*

Photovoltaic (PV) panels work by using the sun's energy to create electricity. Current PV panels contain cells which are made up from layers of semi-conducting material such as silicone. When the sunlight hits the cell, an electric field is created across the layers which are then passed through an inverter that converts the electrical current from Direct Current to Alternating Current, ready for use within a building.

PV technology is considered to be viable for the proposed development, and the design team has incorporated it into the development's energy strategy.

The design team is targeting a 15% reduction in CO_2 emissions from renewable technology for each dwelling (in line with the Code for Sustainable Homes Strategy set out in Appendix 2). To achieve the development's target the PV would be sized accordingly, and design plans have been created displaying the available roof space which is suitable for the installation of PV panels[12].

2.4.6 *Solar Hot Water*

Solar Hot Water (SHW) panels also utilise the sun's energy but to heat water rather than generate electricity. Water is pumped through a solar panel, called a collector, and as the sunlight hits the panel, the water inside is heated and then transferred to a hot water cylinder.

The technology is considered viable for the proposed development, however the current roof design for the dwellings incorporates a number of sustainable features including solar PV panels, roof terraces and winter-gardens with glass roofs[13]. Therefore there is no room to also incorporate solar hot water technology in addition to the other measures proposed.

2.4.7 *Wind Power*

Wind Turbines produce electricity by using the natural power of wind. As the wind hits the blades, this turns a shaft powering a generator which produces electricity. Wind turbines greatly vary in size and there are typically three types of wind turbines available; roof mounted (c.10m in height); pole mounted (c.25m in height); and utility scale turbines (c.45m in height and therefore considered unviable for the proposed development due to space and surrounding land use issues).

Micro wind turbines will generate the most power when turbulence levels in the wind are low. Within the built environment, or near trees or near raised roads, smooth air flow will almost never occur; there will always be some

[12] GML Architects (2014) *Proposed Site Layout Roof Plan*. Drawing No: 4129/SK/13a
[13] GML Architects Roof Plan

turbulence. A life cycle cost analysis conducted by the BRE suggests that there is no payback within the expected life of micro-wind turbines. Micro wind turbines are therefore not proposed for the proposed development.

The Energy Saving Trust say for a wind turbine to be economically valuable you need an average wind speed of at least five meters per second (m/s) in an area free from turbulence caused by surrounding obstacles such as trees or buildings. Pole mounted wind turbines are c.11m tall. The RenSMART wind speed database states that the expected wind speed at this height within the site is predicted to be 4.9m/s. However this does not take into account the impact of turbulence and sheltering caused by nearby landscape features. The site is surrounded by residential and commercial development which is generally 3 stories in height, and therefore the level of sheltering and turbulence experienced within the site is likely to be high. Subsequently pole mounted wind turbines are not considered viable for the proposed development.

2.4.8 *Ground and Air Source Heat Pumps*

Ground source heat pumps (GSHPs) work by extracting heat from the ground. A refrigerant, such as a mixture of water and anti-freeze, is pumped through a series of underground pipes called ground loops. The heat from the ground is absorbed into the liquid and transported to the surface where it is extracted via a heat exchanger. GSHPs are more economic on high density schemes and their use is dependent upon certain geological conditions being present.

Air Source Heat Pumps (ASHPs) work in a very similar way, except the refrigerant runs in pipes within a compact unit and they extract heat from the outside air. Aerothermal power was defined as a renewable energy source by the EU in 2009 (European Union Directive 2009/28/EC, 23rd April 2009).

The heat captured from each system is then compressed, increasing the temperature to around 60 degrees centigrade. This can be used as warm air

heating or to provide hot water as space heating via radiators or under floor systems. Both GSHPs and ASHPs can be reversed when the external temperatures increase to provide cooling.

For every 1 unit of electricity used to power the pumps, they produce 3-6 units of heat or cooling, which is known as their Coefficient of Performance (CoP).

ASHPs are considerably easier to access and maintain than GSHPs because GSHP equipment is contained underground and therefore repairs can be expensive and can lead to equipment being out of use for long periods of time. Therefore GSHPs are not considered viable for the proposed development of 6 dwellings located in an urban environment.

ASHP technology is considered to be viable for the proposed development however at this time is has not been specified as part of the development's energy strategy. The proposed energy strategy for the development is to prioritise energy savings from passive measures and building fabric (in line with the London and Camden Energy Hierarchies), and then to generate energy on site from renewable technologies in the form of solar PV with the aim of achieving Code for Sustainable Homes Level 4 standards for CO_2 emissions.

2.5 Summary

By following the systematic approach contained within the NPPF and the London Energy Hierarchy of first addressing energy savings from efficient design and specification as well as fabric efficiency, then addressing the savings from 'clean' energy, and finally the savings from 'green' energy, the energy use and its associated carbon emissions will be considerably reduced for each of the dwellings in the proposed development via measures such as:

- The incorporation of glazing to utilise natural systems and potentially reduce each dwellings energy consumption;
- The enhancement of the building fabric to reduce heat movement through the dwelling's envelope, thereby reducing energy consumption;
- The specification of energy efficient technologies such as low energy lighting and Mechanical Heat Ventilation Recovery (MVHR) technology; and
- The provision of photovoltaic panels to generate onsite renewable electricity.

3 WATER MANAGEMENT

3.1 Introduction

A consequence of climate change is its effect on water supply, demand and management. Stress is being placed on this resource due to increasing irregularities in rainfall patterns, with periods of drought followed by periods of flash flooding. Greater London is recognised by the Environment Agency (EA) as being an area with serious water stress[14].

Within the Water Resources Strategy for England and Wales, the EA has identified the need to ensure that potable water is used efficiently in new developments. The EA warns that the future demand for and supply of potable water in England and Wales is uncertain, due to increases in population and changes in lifestyle, together with climate change. Therefore if society were to use less water, less would need to be collected, treated, delivered and treated again as waste. These processes require natural resources and energy to perform, therefore reducing potable water consumption can provide a wide array of environmental benefits beyond reducing water stress.

The following section provides a context review of key water management policies, followed by specific environmental sustainability considerations for water management that are relevant to the proposed development.

3.2 Policy Context

3.2.1 *National*

The National Planning Policy Framework (NPPF) says resources, which include water, should be used efficiently and that planning authorities should ensure new development does not cause flood risk to be increased in other locations.

[14] Environment Agency, Areas of Water Stress: Final Classification

3.2.2 *Regional*

The London Plan (Policy 5.13) states that developments should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible.

The April 2014 Sustainable Design and Construction SPG's role is to support developers, local planning authorities and neighbourhoods to achieve sustainable development and meet London Plan policy requirements. One of the suggestions is the incorporation of incorporate rainwater harvesting.

The London Plan (Policy 5.15) states that developments should minimise the use of mains water by incorporating water saving measures and equipment so that mains water consumption would meet a target of 105 litres or less per head per day.

3.2.3 *Local*

The Camden Development Policies document (Policy DP23) says the developments should reduce their water consumption by incorporating water efficient features and equipment, and limit the amount and rate of run-off and waste water entering the combined storm water and sewer network through sustainable urban drainage methods (SUDS).

3.3 Environmental Sustainability Considerations

3.3.1 *Potable Water Consumption*

Different people at different stages of their lives or different family units have different practical uses for water equipment. The average person in the UK currently uses 150 litres of potable water per day. It is good practice to vary the specifications to accommodate the predicted residents' needs as otherwise they are likely to replace the equipment. In doing so, they may not

consider the potable water consumption of the replacement equipment, which could result in greater potable water consumption.

At this stage of design the sanitaryware has not been specified, however the design team is aiming to achieve potable water consumption targets in line with London Plan policy of 105 litres per person per day. Example specifications which would achieve this are provided in Table 3.1.1a and 3.1.1b.

Table 3.1.1a Sanitaryware Specification Example 1

Fitting	Water Consumption
Basin Tap	4 litres/minute
Kitchen Tap	6 litres/minute
Shower	10 litres/minute
Bath	140 litre capacity
WC	4/2.6 litre dual flush
Dishwasher (assumed not present so Government default value used)	1.25 litres/place setting
Washing Machine (assumed not present so Government default value used)	8.17 litres/kg
Total Consumption (litres/person/day)	**104.8**

Table 3.1.1b Sanitaryware Specification Example 2

Fitting	Water Consumption
Basin Tap	5 litres/minute
Kitchen Tap	9 litres/minute
Shower	9 litres/minute
Bath	130 litre capacity
WC	4.5/3 litre dual flush
Dishwasher	1.25 litres/place setting

Washing Machine	8.17 litres/kg
Total Consumption (litres/person/day)	**104.2**

A review has been undertaken to see if it is possible to incorporate rainwater harvesting receptacles. Plan 4129/P/010 shows the terrace between College Road and the front door does not have sufficient space for a receptacle in addition to the recycling and waste bins. Plan 4129/P/013 shows four roof terraces but elevation plan 4129/P/020 shows there is no roof level above them from which to collect and pipe water for harvesting.

3.3.2 *Flood Risk*

The Environment Agency (EA) Flood Risk Maps[15] show that the site is not located in an area at risk of flooding from rivers or the sea.

3.4 Summary

The sanitary ware can be specified to achieve the London Plan policy of 105 litres of water per person per day. The Environment Agency (EA) Flood Risk Maps show that the site is not located in an area at risk of flooding from rivers or the sea.

[15] Environmental Agency [Accessed 11.06.14] Flood Risk Maps http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=floodmap&utm_source=Poster&utm_medium=FloodRisk&utm_campaign=FloodMonth13

4 POLLUTION

4.1 Introduction

The remediation and reduction of existing pollution is highly desirable and the avoidance, as opposed to the mitigation of new pollution, should always be the environmental objective.

The Government therefore attaches great importance to controlling and minimising the potential impacts arising from development, such as air, light, noise, water and ground pollution.

Artificial lighting, if not properly controlled, can be both wasteful of energy and have a significant impact on the quality of life of neighbours and the darkness of the night sky. However some external lighting is necessary to increase the safety and security of the residents and local community.

Dwellings is not associated with causing air quality issues although it is inevitable that emissions to the air will arise during construction it is important to introduce appropriate measures in order to minimise this.

The manufacturing process of certain materials has the potential to release pollutants into the environment and subsequently many materials have been labelled with their Global Warming Potential (GWP) so that their full impacts can be understood. The operation of dwellings can also result in the release of nitrogen oxides (NOx) emissions from heating systems.

Noise can have an effect on the quality of life of both neighbours and employees. Noise pollution can arise from both the construction and operational phases of a development, and can include the noise of machinery, site operations, traffic and alarms.

Groundwater is particularly vulnerable to pollution and it is very difficult to restore the quality of polluted groundwater[16].

The following section addresses potential pollution issues and considers how they could be minimised or mitigated. This comprises a context review followed by the environmental sustainability considerations specific to the proposed development.

4.2 Policy Context

4.2.1 *National*

The National Planning Policy Framework (NPPF) states that the planning system should prevent development from contributing to or being put at unacceptable risk from unacceptable levels of soil, air, water or noise pollution or land instability.

4.2.2 *Regional*

The London Plan (Policy 7.14) states developments should be at least 'air quality neutral,' and promote sustainable design and construction to reduce emissions from the demolition and construction of buildings.

The London Plan (Policy 7.15) states that developments should seek to manage noise by mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development.

4.3 Environmental Sustainability Considerations

4.3.1 *Light Pollution*

Construction

The principal contractor for the proposed development could employ best practice measures during the construction process including:

[16] Europa, Protection of groundwater against pollution, available from: http://europa.eu/legislation_summaries/environment/water_protection_management/l28139_en.htm [accessed 12.3.13]

- Locating and angling construction site lighting with consideration to any nearby light sensitive receptors;
- Where possible, arranging construction site deliveries during daylight hours to reduce light pollution generated from vehicle headlights; and
- Where possible, installing screening/fencing around the boundary of the construction site so that vehicle headlights, flashing beacons etc do not directly shine on light sensitive receptors.

Operation

As discussed in the introduction and shown on plan 4129/P/010 the site is adjacent to the rear gardens of properties facing onto Lady Somerset Road and Evangelist Road. The existing green wall between the site and the garden of the properties facing onto Lady Somerset Road will be retained. As shown on plan 4129/P/022 there will not be any windows above the height of the green wall that should spill light into these gardens.

The wall between the site and the garden of the properties facing onto Evangelist Road is not high enough (plan 4129/P/021) to shield the first floor 14.1m^2 to 14.3m^2 rooms. The external wall has therefore been designed to be stepped as shown on the plan 4129/P/012 so that light through the window can only escape horizontally via a 90 degree angle and a small opening.

4.3.2 *Air Pollution*

Construction

The principal contractor for the proposed development could employ best practice measures during the construction process including:

- The regular 'damping down' of all dry areas;
- Minimising the vehicle tipping height for materials;

- Covering loose materials and storing away from prevailing wind;
- Prohibiting burning waste materials on site; and
- Turning off vehicle or plant engines when not in use.

Operation

The site contains a dis-used commercial building, and the surrounding land contains residential properties and commercial uses including a car workshop. The site is not located within an Air Quality Management Zone[17]. The proposed development consists of the creation of six new dwellings and no car parking.

Dwellings are not associated with air pollution however the heating systems could be a source of pollution if biofuel was to be utilised. Instead highly efficient gas boilers are to be utilised. These will be have NOx emissions of less than 40mg/kWh which, as the Code for Sustainable Homes (CfSH) Pre-Assessment (Appendix 2) shows achieves the maximum credits for reducing air pollution (Pol 2).

4.3.3 *Noise Pollution*

Construction

The principal contractor for the proposed development could employ best practice measures during the construction process including:

- Turning off vehicle or plant engines when not in use, and keeping acoustic doors and hoods on plant closed;
- Locating site plant and machinery as far as possible from nearby noise sensitive receptors;
- Usage of noise screens;

[17] DEFRA [Accessed 17.06.14] List of Local Authorities with AQMAs http://uk-air.defra.gov.uk/aqma/list

- Where possible using silent generators, pumps and tower lights and choosing quieter plant; and
- Minimising drop heights into lorries and vehicle reversing to avoid the use of the reverse beeper.

Operation

The site contains a dis-used commercial building, and the surrounding land contains residential properties and commercial uses including a car workshop. The site is c.20m from the B518 Highgate Road linking Kentish Town with Highgate. The proposed development consists of the creation of six new dwellings and no car parking. The UK Census Data for the ward in which the site is located shows the local population density is 131.5 people per hectare with an average household size of 2.4. The road network and population density indicate the area is already is already experiencing noise levels that are likely to be consistent with the use of six dwellings without car parking.

4.3.4 *Water and Ground Pollution*

Construction

To reduce the risk of water pollution during construction, the principal contractor for the proposed development could employ best practice measures including:

- The use of drip trays with all stationary machinery;
- The secure and diligent storage of hazardous materials to prevent incidence of pollution; and
- The implementation of procedures to clean up spills immediately after occurring to minimise further pollution.

Operation

The potential for contamination to water and ground from housing is not normally considered to be high particularly when they contain no parking area or gardens.

4.4 Summary

Best practice measures can be employed during the construction process to minimise the risk of air, light, noise, water and ground pollution. The design of the dwellings and the specification of the heating system aim to reduce operational impacts from light and air pollution.

5 MATERIALS & WASTE

5.1 Introduction

Material use and waste generation are inextricably linked and therefore have been considered together. The construction industry in England and Wales consumed 400 million tonnes of materials in 2012[18] and as at April 2014, is annually generating 120 million tonnes of waste, which equates to a third of all waste in the UK[19].

The following section provides a context review of sustainable construction and waste policies, followed by the environmental sustainability considerations that are specific to the proposed development.

5.2 Policy Context

5.2.1 *National*

The National Planning Policy Framework (NPPF) does not contain specific materials and waste policies. It does state that waste will be covered in the, as yet un-adopted, National Waste Management Plan for England. The NPPF states that in the intermediary time PPS10 will continue to represent national policy on waste management[20].

PPS10: Planning for Sustainable Waste Management states that the design and layout of new development should support sustainable waste management.

The Waste Strategy for England and Wales sets out a waste hierarchy, which says that waste should firstly be reduced, then re-used if possible and following that, materials should be recovered from waste to be recycled. The next best option is for any energy within items to be recovered. Only where

[18] Environment Agency (accessed 18/06/12) *Sustainable Construction: Position Statement* http://www.environment-agency.gov.uk/cy/ymchwil/llyfrgell/safbwynt/41239.aspx
[19] UK Green Building Council (accessed April 2014) *Waste* http://www.ukgbc.org/content/waste
[20] DCLG (2012) *National Planning Policy Framework.* Paragraph 5 - Introduction

these options have been fully evaluated should the waste be disposed of. This is illustrated in Figure 5.2.

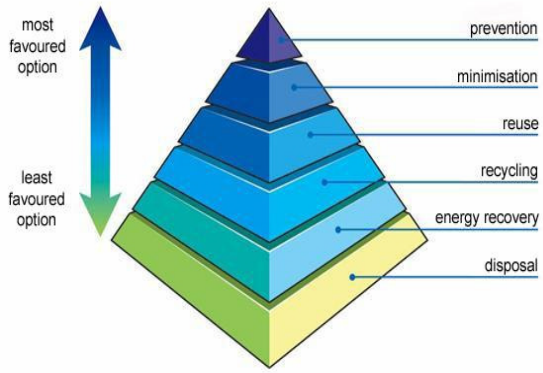


Figure 5.2: Waste Hierarchy

5.2.2 ***Regional***

The London Plan (Policy 5.17) requires suitable waste and recycling storage facilities in all new developments.

The Housing SPG 2013 and the Sustainable Design and Construction SPG 2013 provide guidance saying that development should provide sufficient internal space for the storage of recyclable and compostable materials and waste, and communal refuse areas and storage facilities in accordance with the Code for Sustainable Homes.

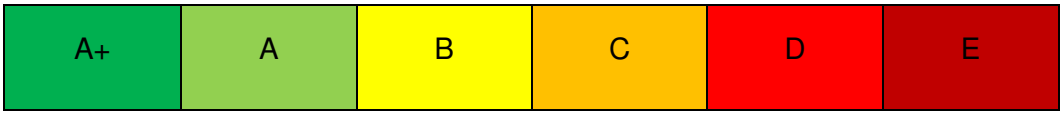
5.2.3 ***Local***

The Camden Core Strategy (Policy CS18) sets outs the LBC's desire to make Camden a low waste borough, which includes the aim of recycling 45% of all household waste generated within the borough by 2015, and 50% by 2020.

5.3 Environmental Sustainability Considerations

5.3.1 *Materials*

The Building Research Establishment (BRE) publishes a Green Guide to Specification[21] which assesses the relative environmental impacts of construction materials commonly used in buildings. Materials are given an overall rating of between A+ to E which is calculated using the Environmental Profiles Methodology, created by BRE in 2008[22]. Those which are rated A+ represent the best environmental performance/least environmental impact such as being made with recycled materials, whereas those which are rated E have the worst environmental performance/most environmental impact such as having high embedded carbon.



At this stage of the planning process the precise materials are not known however it is reasonable given the design to base them on the following:

- Beam and dense block deck, EPDM single play roofing membrane, insulation, paving slabs (Green Guide Rating D);
- Galvanised steel rafters and joists with insulation, roofing underlay, counter battens, battens and UK produced slate (Green Guide Rating A);
- Brickwork outer leaf, insulation, aircrete blockwork inner leaf, cement mortar, plasterboard, paint (Green Guide Rating A+);
- Cement rendered aircrete blockwork cavity wall, insulation, cement mortar, plasterboard on battens, paint (Green Guide Rating A+);

[21] BRE (accessed April 2013) *Background to Green Guide to Specification* http://www.bre.co.uk/greenguide/page.jsp?id=2069
[22] BRE (accessed April 2013) *Background to Green Guide to Specification* http://www.bre.co.uk/greenguide/page.jsp?id=2069

- Galvanised steel stud, plasterboard and paint (Green Guide Rating A);
- Aircrete blockwork with plasterboard and paint (Green Guide Rating B);
- Screeded in situ concrete slab, over insulation on polyethylene dpm laid on blinded recycled aggregate sub-base (Green Guide Rating C);
- Screeded insitu concrete slab (Green Guide Rating E); and
- Powder coated aluminium clad softwood window, double glazed, solvent based gloss paint internally (Green Guide Rating B).

The design team are aware that there are the minimum Green Guide rating requirements and will endeavour wherever practical to specify materials which improve upon these. In addition, in line with the CfSH strategy (Appendix 2), a good purchasing policy should be adopted and materials utilised which have been certificated as sustainably sourced.

5.3.2 *Demolition and Construction Waste*

The site contains a disused commercial building which will be demolished as part of the proposed development. During the detailed design stage the project team will assess the building to identify any opportunities for the reuse of demolition material either as primary high grade aggregate or low grade aggregate.

The proposed development is targeting Code for Sustainable Homes (CfSH) Level 4 standards throughout, and a CfSH strategy is contained within Appendix 2. To achieve CfSH Level 4 the Site Waste Management Plan (SWMP) credits have been targeted. To achieve these credits a SWMP is

required for the duration of the construction process and sustainable practices and measures for example[23,24]:

- Creation of a dedicated area on site for waste storage;
- Correct storage of materials to prevent spoilage;
- Sorting of any waste materials into streams for potential recycling (e.g. metals, plastics etc.). Further to this opportunities will be sought to utilise materials from the waste stream, either in the new build such as on site crushing of concrete and hard standing for re-use as secondary aggregate which could be used as a sub-base beneath roads and parking areas;
- Regular monitoring of waste arisings, enabling targets to be set for the minimisation of construction waste;
- Ordering only the required quantity of materials to prevent over ordering and materials exceeding their shelf life; and
- Full induction and on-site training of the contractor workforce to ensure that best practice waste management principles are implemented.

All of these measures will help achieve the CfSH target of diverting 85% (by weight or volume) of construction waste from going to landfill.

5.3.3 *Operational Waste*

Plan 4129/P/011 shows space for two bins in the area to the left of the dwellings gates on College Lane and the front door.

The London Borough of Camden (LBC) offers a refuse collection service to residents, providing separate bins for general waste, recyclable waste, food

[23] BRE (2008) *Sustainable Construction, Simple Ways to Make it Happen*
[24] WRAP (2008) *Guidance for Client Project Managers. Actions to Reduce Waste in Construction Projects and Minor Works*

waste and green garden waste. There are no gardens so this bin and space for it are not required. The food waste bin is stored internally until the time for collection.

Recyclable materials collected by the London Borough of Camden in the recyclable waste bin include[25]:

- Wax-lined, poly-lined and foil-lined cartons (e.g. milk cartons, Tetra Pak);
- Plastic and glass bottles;
- Plastic bags;
- Drinks and food cans;
- Aluminium foil; and
- Newspapers, magazines, cardboard and paper.

5.4 Summary

A good materials purchasing policy will be followed. The minimum Green Guide ratings have been set with the aim of exceeding them. Materials certificated as sustainably sourced will be utilised. 85%, by volume or weight, of the construction waste will be diverted from landfill.

[25] London Borough of Camden [Accessed 11.06.14] Recycling Collection http://www.camden.gov.uk/ccm/content/environment/waste-and-recycling/recycling-your-waste/doorstep-waste-and-recycling-collections.en

6 SUSTAINABLE TRANSPORT

6.1 Introduction

It is widely recognised that petrol and diesel are finite resources and vehicles powered by these fuels produce emissions of carbon dioxide, carbon monoxide, oxides of nitrogen, volatile organic compounds and particulates which impact upon global warming, local air quality, and can cause ill health.

Transport is estimated to be responsible for a quarter of total UK emissions of carbon dioxide. The UK Government has recognised that reducing emissions from transport is necessary if the UK is to meet its targets for emissions reductions[26].

Improving accessibility and availability of alternative transport modes such as buses and bicycles can reduce the need for single occupancy car journeys and provide a more sustainable transport network whilst also reducing congestion and the associated greenhouse gas emissions.

The following section provides a context review of key sustainable transport policies, followed by environmental sustainability considerations that are relevant to the proposed development.

6.2 Policy Context

6.2.1 *National*

The National Planning Policy Framework (NPPF) states that developments should be located and designed where practical to accommodate the efficient delivery of goods and supplies, give priority to pedestrian and cycle movements, create safe and secure layouts which minimise conflicts between traffic, cyclists and pedestrians, and consider the needs of people with disabilities[27].

[26] Department of Energy and Climate Change, (2011) *Statistical Release, UK Climate Change Sustainable Development Indicator.*
[27] DCLG (2012) *National Planning Policy Framework*. Paragraph 35 – Promoting Sustainable Transport

6.2.2 *Regional*

The London Plan (Policy 6.9) says that developments should provide secure, integrated and accessible cycle parking facilities.

The Housing SPG provides guidance on Policy 6.9, saying that 1 space should be provided per 1-2 bedroom dwellings, and 2 spaces provided for 3+ bedroom dwellings. It also says that cycle storage should be secure, covered, adequately lit, and provide access to the street. The Sustainable Design and Construction SPG also provides guidance on Policy 6.9, saying that developments should provide access to, and promote low carbon transport modes including walking and cycling.

6.2.3 *Local*

The Camden Core Strategy (Policy CS11) says that the council will minimise the provision of private parking in all new developments.

The Camden Core Strategy (Policy CS13) says that development should minimise the need of occupants to travel by car.

The Camden Development Policies document (Policy DP17) says that developments should make suitable provision for pedestrians, cyclists and public transport.

The Camden Development Policies document (Policy DP18) seeks to ensure that developments provide the minimum necessary car parking provision, and that development provides cycle parking.

6.3 Environmental Sustainability Considerations

6.3.1 *Site Accessibility*

The site connects to Collage Lane which after 20m connects to Highgate Road (B518). As shown on plan 4129/P/010 as a result of the development a 6m turning radius will be created.

A Public Transport Accessibility Level (PTAL) report has been generated for the site which shows it has a PTAL score of 5. This high score is due to the following[28]:

- The site is within 500m (7 minutes' walk) of 4 different bus stops each serviced by different bus routes (C2, C11, 134, 214 and 393);
- The site is within 450m (6 minutes' walk) of the Kentish Town London Underground Station which is served by the Northern Line;
- The site is within 450m (6 minutes' walk) of Kentish Town train station which is served by the Sutton Loop Line and the Bedford to Sevenoaks line; and
- The site is within 800m (10 minutes' walk) of the Gospel Oak train station which is served by the Gospel Oak to Barking Line and the North London Line.

In March 2013 the Mayor of London launched his Vision for Cycling in London, which sets outs plans to transform the role of cycling in the capital. To deliver this the Mayor announced £913million investment for cycling over the next 10 years[29]. The site lies within 500m of London Cycle Route 6a, which joins Highgate Road from Gordon House Road, and 700m of London Cycle Route 14 which has a terminus at Tufnell Park[30].

In summary the site is well connected to the London public transport network and cycle network. This will enable and encourage future occupants of the proposed dwellings to use more sustainable modes of transport than the private car, and therefore lower their environmental impact.

Each dwelling is provided with a vertical cycle storage locker to allow secure storage of one bicycle, thereby encouraging residents to use more

[28] Transport for London [Accessed 11.06.14]TFL Planning Information Database http://www.webptals.org.uk/
[29] London Borough of Camden [Accessed 11.06.14] Cycling in Camden http://www.camden.gov.uk/ccm/navigation/transport-and-streets/cycling-in-camden/
[30] Open Street Map [Accessed 11.06.14] http://www.openstreetmap.org/#map=16/51.5554/-0.1391&layers=C

sustainable modes of transport than the private car. Furthermore, in accordance with Policy CS13 the development has been designed as a 'zero car' development, and provides no private parking within the site thereby further encouraging residents to use alternative forms of transport.

A Building User Guide (BUG) will be provided to the initial occupier of each dwelling. The BUG will include information on local public transport routes, nodes and timetables as well as key pedestrian and cycle routes within the area.

6.4 Summary

The site has a good PTAL of 5 due to the easy access to public transport. Cycle storage for each dwelling will be provided and the site is within 500m of London Cycle Route 6a and 700m of Route 14. The development has been designed as 'zero car'.

7 LAND USE & BIODIVERSITY

7.1 Introduction

England has a finite amount of land and, as with any resource, it is important to use it efficiently. Recycling brownfield land represents best practice and using land close to or within existing communities represents good practice.

Biodiversity is the biological diversity or variety of life in a given area. Developers can contribute to the improvement of biodiversity through the conservation and ecological enhancement of onsite habitats of value and creation of habitats. Ideally there would be no net loss in biodiversity but an enhancement.

The following section provides a context review of key sustainable land use and biodiversity policies, followed by environmental sustainability considerations that are relevant to the proposed development.

7.2 Policy Context

7.2.1 *National*

The National Planning Policy Framework (NPPF) states that when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by encouraging opportunities to incorporate biodiversity in and around developments[31].

The NPPF also states that planning policies and decisions should encourage the effective use of land by re-using land that has been previously developed (brownfield land), provided that it is not of high environmental value[32].

[31] DCLG (2012) *National Planning Policy Framework.* Paragraph 118 – Conserving and Enhancing the Natural Environment
[32] DCLG (2012) *National Planning Policy Framework.* Paragraph 111 – Conserving and Enhancing the Natural Environment

7.2.2 *Regional*

The **London Plan** (Policy 5.10) says developments should integrate green infrastructure to contribute to urban greening.

The Sustainable Design and Construction SPG 2014 provides guidance on Policy 5.10 saying that developments should include new tree planting and link to the wider green infrastructure network where possible.

The **London Plan** (Policy 7.19) says developments should, wherever possible, make a positive contribution to the enhancement, creation and management of biodiversity.

The Sustainable Design and Construction SPG 2014 provides guidance on Policy 7.19 stating that there should be no net loss in the quantity and quality of biodiversity, and that developers should make a contribution to biodiversity on their development site.

7.2.3 *Local*

The Camden Development Policies document (Policy DP22) says that developments should incorporate green or brown roofs and green walls wherever suitable.

7.3 Environmental Sustainability Considerations

7.3.1 *Brownfield Land*

The site consists of developed 'brownfield' land which is currently occupied by a disused commercial building. The development of brownfield land represents environmental best practice because the re-use of developed site releases their potential and reduces the need for construction on previously undeveloped 'greenfield' land which would result in a net loss of green space, and potentially a negative impact on flora and fauna.

7.3.2 *Efficient Land Use*

The four terraced houses have each been designed (plan 4129/P/013) with a private roof terrace and the two town houses have been designed with an external terrace each (plan 4129/P/010 and 012). The four terraced houses also have 'winter gardens' with sliding galls roofs on the lower ground floor.

Accommodating external areas, particularly the flexible 'winter gardens' within six dwellings located on a brownfield site of 0.0512ha represents an efficient use of land.

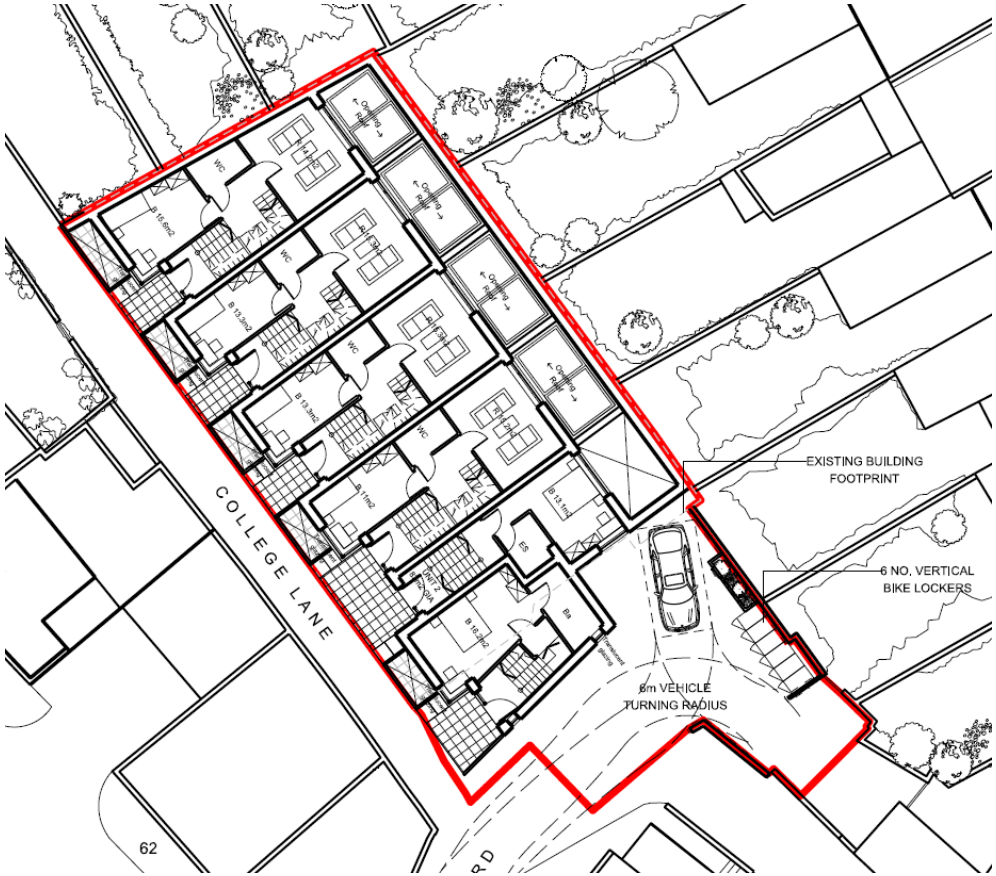
7.3.3 *Biodiversity*

The site does not contain other features. Drawing 4129/P/200 shows that the existing site contains a substantial green wall on the north and east site boundary. This 'green wall' is at its densest and most visually impressive on the north façade which adjoins gardens of residential properties which front onto Lady Somerset Road. Plan 4129/P/022 shows the green wall is retained at full height on the north of the site. Plan 4129/P/021 shows the green wall on the east site boundary will be reduced in height to just below the upper ground floor window. Plan 4129/P/013 shows that most of the roof area is being utilised for PV, terraces and 'winter garden' glass sliding roofs.

7.4 Summary

The efficient use of a brownfield site in an urban area close to amenities and good public transport represents very good site practice and accords with the NPPF. The retention of the majority of an existing green wall also represents very good site practice and accords with Policy DP22.

APPENDIX 1 – SITE PLAN



APPENDIX 2 – CODE FOR SUSTAINABLE HOMES PRE-ASSESSMENT

This Code for Sustainable Homes strategy demonstrates a means by which CfSH (November 2010 version) Level 4 can be targeted for the proposed 2-3 storey terraced houses at 1-8 College Yard, Kentish Town.This strategy has been based on the following drawings: 'SK10 Rev A', 'SK11 Rev A', 'SK12 Rev A', 'SK13 Rev A', 'SK17 Rev B', 'SK18 Rev A', 'SK19 Rev A', 'SK20 Rev A', 'SK26 Rev A', 'SK27 Rev A' and 'SK28 Rev A'.

Development Name 1-8 College Yard, Kentish Town

Description 3 mid-terrace and 1 end-terrace 3-storey houses, and 2 end terrace town houses.

Version Final

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Energy and Carbon Dioxide emissions										
Ene1	Dwelling Emission Rate	10	**5.3**	**5.3**	**5**	**5**	**5**	**5.5**	To limit CO_2 emissions arising from the operation of a dwelling and its service in line with current policy on the future direction of regulations.	URS provided a few different approaches for the building fabric to GML Architects. GML confirmed (E-mail 11/06/14 11:33) that the URS 'Scenario 2' is the preferred approach. As this has been used throughout all the calculations, items can only be changed to those with the same or enhanced u-values. **Scenario 2:** External Walls - 0.20 W/m²K Party Walls - Fully filled and sealed cavity Ground Floor - 0.12 W/m²K Flat Roof - 0.12 W/m²K Windows - 1.30 W/m²K Doors - 1.00 W/m²K Air Permeability - 3.00m³/hm² @ 50 Pa Thermal Bridging - Accredited Construction Details followed Scenario 2 combined with the fabric, lighting, heating, ventilation and a few other minor items (all of which have a specification and cost impact) feed into the SAPs. The Interim SAP Summary Report attached to this Strategy report contains full details. Based on the current 'As Designed' SAP calculations the dwellings are targeting between a 47% and a 53% improvement over Building Regulations Part L1a 2010.
Ene2	Fabric Energy Efficiency	9	**3.5**	**3**	**4.2**	**4.2**	**4.2**	**5.4**	To improve the fabric energy efficiency performance thus future proofing reductions in CO2 for the life of the dwelling	See Ene1 for details. Based on the sample 'As Designed' SAP calculations run, all dwellings are targeting a FEE score of between 44 and 51 kWh/m²/year.
Ene3	Energy Display Devices	2	**2**	**2**	**2**	**2**	**2**	**2**	To promote the specification of equipment to display energy consumption data, thus empowering dwelling occupants to reduce energy use	Energy Display Devices that monitor mains electricity and the primary heating fuel (likely to be gas) must be provided to each dwelling. The display device must be capable of displaying the following information: • Local time; • Current mains energy consumption (kilowatts and kilowatt hours); • Current emissions (g/kg CO_2); • Current tariff; • Current cost in pounds and pence (for pre-payment customers this should be 'real time' data and for 'credit' paying customers cost should be displayed on a monthly basis); • Display accurate account balance information (amount in credit or debit); • Visual presentation of data (i.e. non-numeric) to allow consumers to easily identify high and low level of usage; and • Historical consumption data so that consumers can compare their current and previous usage in a meaningful way (this should include cumulative consumption data in any of the following forms: day/week/month/billing period).

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Ene4	Drying Space	1	1	1	1	1	1	1	To provide a reduced energy means of drying clothes	Internal retractable drying lines must be provided within each dwellings bathroom. The provided drying lines must have a minimum line length of 6 meters and be permanently fixed within the dwelling. The room must also have suitable ventilation designed in accordance with Building Regulations Part F.
Ene5	Energy Labelled White Goods	2	2	2	2	2	2	2	To promote the provision or purchase of energy efficient white goods, thus reducing the CO2 emissions from appliance use in the dwelling	EU rated white goods with a minimum of the following ratings: • Fridge-freezers will be A+ rated; • Dishwashers and washing machines will be A rated; and • Tumble dryer or washer-dryers will be B rated.
Ene6	External Lighting	2	2	2	2	2	2	2	To promote the provision of energy efficient external lighting, thus reducing the CO2 emissions associated with the dwelling	Low energy external light fittings must be provided for entrances/front door, patio and balcony areas. If the provision of security lighting is a requirement of Secured by Design or requested by the homeowner, then any burglar security lighting specified must have a maximum wattage of 150W, PIR and daylight cut-off sensors, and all other security lighting must be energy efficient and be fitted with daylight cut off sensors or timers.
Ene7	Low and Zero Carbon Technologies	2	2	2	2	2	2	2	To limit CO2 emissions and the running costs arising from the operation of a dwelling and its services by encouraging the specification of low and zero carbon energy sources to supply a significant proportion of energy demand	The drawings show a total of 39 PV panels on the roof. The 'As Designed' sample SAPs have been calculated to target a 15% reduction in Carbon Emissions per dwelling due to the use PV. The following amounts of PV must be provided to the dwellings to target the 15% reduction: Units 1 and 2 - 5no. 250w panels, Units 3, 4 and 5 - 6no. 250w panels, Unit 6 - 7no. 250w panels.
Ene8	Cycle Storage	2	1	1	1	1	1	1	To promote the wider use of bicycles as transport by providing adequate and secure cycle storage facilities, thus reducing the need for short car journeys and the associated CO2 emissions	GML Architects (Ref: email to Paul Osborne 10/06/1412:23) confirmed that the plans are being amended to include the provision for one cycle space per dwelling. Each cycle space must enable the frame and wheel of the cycle to be locked to the secure fixing and allow for cycles to be removed independently.
Ene9	Home Office	1	1	1	1	1	1	1	To promote working from home by providing occupants with the necessary space and services thus reducing the need to commute	A suitable wall within each plot is in the rooms, as labelled on the drawings:- • Unit 1 - B13 • Unit 4 - R16 • Unit 2 - B11 • Unit 5 - R16 • Unit 3 - R15 • Unit 6 - R15 The home office space wall length must contain two double power sockets, and unless broadband is provided, 2 phone sockets. The room must retain the openable window for ventilation (trickle vents to not comply).
Sub Total		**31**	**19.8**	**19.3**	**20.2**	**20.2**	**20.2**	**21.9**	1 Ene credit is worth (1.17%)	
Weighted sub total		**36.4**	**23.2**	**22.7**	**23.7**	**23.7**	**23.7**	**25.7**		

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Water										
Wat1	Internal Water Use	5	3	3	3	3	3	3	To reduce the consumption of potable water in the home from all sources, including borehole well water, through the use of water efficient fittings, appliances and water recycling schemes	The installed equipment must reduce the internal potable water consumption to no greater than 105 litres/person/day. One example of how this can be achieved is: • Dual flush toilet (4/2.6 litre flushes) • Wash hand basin taps (flow rate no greater than 4 litres/minute) • Kitchen sink tap (flow rate no greater than 6 litres/minute) • Shower (flow rate no greater than 9 litres/minute) • Baths (capacity of 180 litres) • Washing machines (no greater than 8.17 litres per kilogram) • Dishwashers (no greater than 1.25 litres per place setting) Other examples can be provided upon request.
Wat2	External Water Use	1	1	1	0	0	0	0	To promote the recycling of rainwater and reduce the amount of mains potable water used for external water uses	The BRE have confirmed that the credit can be awarded by default to developments which do not include a garden or garden planting. Units 1 and 2 have an external terrance/patio which, it has been confirmed by GML Architects (18.06.14), will not include planting.
Sub Total		6	4	4	3	3	3	3	1 Wat credit is worth (1.50%)	
Weighted sub total		9.0	6.0	6.0	4.5	4.5	4.5	4.5		
Materials										
Mat1	Environmental Impact of materials	15	6	6	6	6	6	6	To specify materials with lower environmental impacts over their life-cycle	Sample materials calculations have been produced based on the following typical build-ups as the materials are not known: • Beam and dense block deck, EPDM single play roofing membrane, insulation, paving slabs (Green Guide Rating D) • Galvanised steel rafters and joists with insulation, roofing underlay, counter battens, battens and UK produced slate (Green Guide Rating A) • Brickwork outer leaf, insulation, aircrete blockwork inner leaf, cement mortar, plasterboard, paint (Green Guide Rating A+) • Cement rendered aircrete blockwork cavity wall, insulation, cement mortar, plasterboard on battens, paint (Green Guide Rating A+) • Galvanised steel stud, plasterboard and paint (Green Guide Rating A) • Aircrete blockwork with plasterboard and paint (Green Guide Rating B) • Screeded in situ concrete slab, over insulation on polyethylene dpm laid on blinded recycled aggregate sub-base (Green Guide Rating C) • Screeded insitu concrete slab (Green Guide Rating E) • Powder coated aluminium clad softwood window, double glazed, solvent based gloss paint internally (Green Guide Rating B) If the materials change they must match or go beyond the green guide rating.
Mat2	Responsible Sourcing of Materials - Basic Building Elements	6	4	4	4	4	4	4	To promote the specification of responsibly sourced materials for the basic building elements	Based on our previous experience of awarding these credits a score of between 3-5 credits is likely to be achieved via a good purchasing policy, which the applicant will need to implement.
Mat3	Responsible Sourcing of Materials - Finishing Elements	3	2	2	2	2	2	2	To promote the specification of responsibly sourced materials for the finishing elements	Based on our previous experience of awarding these credits a score of between 2-3 credits is likely to be achieved via a good purchasing policy, which the applicant will need to implement.
Sub Total		24	12	12	12	12	12	12	1 Mat credit is worth (0.30%)	
Weighted sub total		7.2	3.6	3.6	3.6	3.6	3.6	3.6		

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Surface water run-off										
Sur1	Management of surface water from developments	2	**0**	**0**	**0**	**0**	**0**	**0**	To design surface water drainage for housing developments which avoid, reduce and delay the discharge of rainfall run off to water courses and public sewers using SuDS techniques. This will protect receiving waters from pollution and minimise the risk of flooding and other environmental damage in watercourses	We understand that the site is currently covered in hard standing. If this is the case the mandatory element of Sur1 could be met via the default case. A suitably qualified individual must be appointed to complete the Sur1 template. Failure to meet the mandatory requirements means that CfSH certification cannot be obtained.
Sur2	Flood Risk	2	**0**	**0**	**0**	**0**	**0**	**0**	To promote housing development in low flood risk areas, or to take measures to reduce the impact of flooding on houses built in areas of medium or high risk of flooding	The Environmental Agency Flood Map shows the site to be located within Flood Zone 1, however a suitably qualified individual would need to be appointed to produce a flood risk assessment.
Sub total		**4**	**0**	**0**	**0**	**0**	**0**	**0**	1 Sur credit is worth (0.55%)	
Weighted sub total		**2.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**		
Waste										
Was1	Storage of non-recyclable waste and recyclable household waste	4	**4**	**4**	**4**	**4**	**4**	**4**	To provide adequate internal and external storage space for non-recyclable waste and recyclable household waste	A kitchen cupboard must accommodate a bin with a total volume of 30 litres that has at least three compartments, each greater than 7 litres in volume. GML Architects (Ref: email to Paul Osborne 10/06/1412:23) have confirmed that access to the external bin store will be via level thresholds and suitable for wheelchair users. The 240 litre external capacity requirements is shown on the ground floor plan.
Was2	Construction Site Waste Management	3	**3**	**3**	**3**	**3**	**3**	**3**	To promote resource efficiency via the effective and appropriate management of construction site waste.	A SWMP that follows the Code for Sustainable Homes (Nov 2010) guidance must be created and followed throughout the duration of the construction of the development. The contractor must ensure that a minimum of 85% of non-hazardous construction waste (either by weight or by volume) has been diverted from landfill.
Was3	Composting	1	**1**	**1**	**1**	**1**	**1**	**1**	To promote the provision of compost facilities to reduce the amount of household waste sent to landfill	Camden Council provide an indoor caddy for use within the kitchen and an outdoor caddy to use to empty the contents of the kitchen caddy when it becomes full. Drawings show there is internal and external space for both.
Sub total		**8**	**8**	**8**	**8**	**8**	**8**	**8**	1 Was credit is worth (0.8%)	
Weighted sub total		**6.4**	**6.4**	**6.4**	**6.4**	**6.4**	**6.4**	**6.4**		

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Pollution										
Pol1	Global Warming Potential (GWP) of insulants	1	**1**	**1**	**1**	**1**	**1**	**1**	To promote the reduction of emissions of gases with high GWP associated with the manufacture, installation, use and disposal of foamed thermal and acoustic insulating materials	All insulation materials must have a global warming potential of less than 5 for the following areas: • Roof • Floors • Walls • Hot water cylinders and other pipework
Pol2	NOx emissions	3	**3**	**3**	**3**	**3**	**3**	**3**	To promote the reduction of Nitrogen Oxide (NOx) emissions into the atmosphere	The combined space heating and hot water heating equipment must not exceed NOx emissions of 40mg/kWh.
Sub total		**4**	**4**	**4**	**4**	**4**	**4**	**4**	1 Pol credit is worth (0.70%)	
Weighted sub total		**2.8**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**	**2.8**		
Health and Wellbeing										
Hea1	Daylighting	3	**2**	**2**	**2**	**2**	**2**	**2**	To promote good daylighting and thereby improve quality of life and reduce the need for energy to light the home	Preliminary Average Daylight Factor (ADF) calculations have been undertaken based on the drawings. These calculations confirm that kitchens within all dwellings can predict an ADF of >2%; and the living, dining and home office rooms can predict an ADF of >1.5%.
Hea2	Sound insulation	4	**3**	**3**	**3**	**3**	**3**	**3**	To promote the provision of improved sound insulation to reduce the likelihood of noise complaints against neighbours	Robust Details or design advice must be sought from a suitably qualified sound engineer prior to the detailing of the separating floor and walls to ensure that the dwellings can achieve a 5db sound insulation testing improvement over Building Regulations Part E.
Hea3	Private Space	1	**1**	**1**	**1**	**1**	**1**	**1**	To improve the quality of life by promoting the provision of an inclusive outdoor space which is at least partially private	Based on the drawings, the following private space is provided to each dwelling: Unit 1 - Ground Floor Patio Unit 4 - Roof Terrace Unit 2 - Balcony Unit 5 - Roof Terrace Unit 3 - Roof Terrace Unit 6 - Roof Terrace GML confirmed that all thresholds to private space will be level (Ref: email to Paul Osborne 10/06/1412:23).
Hea4	Lifetime Homes	4	**4**	**4**	**4**	**4**	**4**	**4**	To promote the construction of homes that are accessible and easily adaptable to meet the challenging needs of current and future occupants	GML Architects (Ref: email to Paul Osborne 10/06/1412:23) confirmed they are currently changing the drawings to include Lifetime Homes and meet all applicable 16 criteria.
Sub total		**12**	**10**	**10**	**10**	**10**	**10**	**10**	1 Hea credit is worth (1.17%)	
Weighted sub total		**14.0**	**11.7**	**11.7**	**11.7**	**11.7**	**11.7**	**11.7**		

Credit title		Credits							Aim of Credit	Confirmation of credits sought
		credits available	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6		
Management										
Man1	Home User Guide	3	**3**	**3**	**3**	**3**	**3**	**3**	To promote the provision of guidance enabling occupants to understand and operate their homes efficiently and make the best use of local facilities	Ensure that a Code for Sustainable Homes compliant Home Users Guide is provided to each dwelling. URS can provide guidance on this to ensure all the applicable categories have been covered within the users guide.
Man2	Considerate Constructors Scheme	2	**2**	**2**	**2**	**2**	**2**	**2**	To promote the environmentally and socially considerate, and accountable management of construction sites	The client and contractor must ensure that the site is registered with the Considerate Constructors Scheme and that a score of at least 35, with no less than 7 in any one category, is achieved.
Man3	Construction site impacts	2	**2**	**2**	**2**	**2**	**2**	**2**	To promote construction sites managed in a manner that mitigate environmental impacts	Ensure that during the construction of the development, the following items are undertaken: • monitor and report energy use arising from site activities • monitor and report water consumption from site activities • adopt best practice policies in respect of dust (air) pollution • adopt best practice policies in respect of water (ground and surface) • pollution
Man4	Security	2	**0**	**0**	**0**	**0**	**0**	**0**	To promote the design of development where people feel safe and secure - where crime and disorder, or the fear of crime, does not undermine quality of life or community cohesion	GML Architects confirmed that they have not sought design advice from a Secure by Design officer.
Sub total		**9**	**7**	**7**	**7**	**7**	**7**	**7**	1 Man credit is worth (1.11%)	
Weighted sub total		**10.0**	**7.8**	**7.8**	**7.8**	**7.8**	**7.8**	**7.8**		
Ecology										
Eco1	Ecological value of site	1	**1**	**1**	**1**	**1**	**1**	**1**	To promote the development on land that already has a limited value to wildlife, and discourage development on ecologically valuable sites	It is understood that the site currently comprises of hard standing with no vegetation. A copy of the Eco1 checklist has been completed to assess the sites current ecological value. The checklist confirms that the site is of low ecological value.
Eco2	Ecological enhancement	1	**1**	**1**	**1**	**1**	**1**	**1**	To enhance the ecological value of a site.	A Suitably Qualified Ecologist will need to be appointed to give recommendations of how to enhance the sites ecological value. All key and 30% of the additional recommendations must be incorporated.
Eco3	Protection of ecological features	1	**1**	**1**	**1**	**1**	**1**	**1**	To promote the protection of existing ecological features from substantial damage during the clearing of the site and the completion of the construction works	The site has been calculated as having a low ecological value (as Eco1), therefore this credit can be targeted by default.
Eco4	Change of ecological value of site	4	**2**	**2**	**2**	**2**	**2**	**2**	To minimise reductions and promote an improvement in ecological value	This follows on from Eco1 and Eco2. It is understood that the site currently comprises of hard standing with no vegetation. Given the proposed high density of the building shown on the drawings, it is likely that there will be little to no vegetation included as part of the development. It is likely that there will be a neutral change in ecological value.
Eco5	Building footprint	2	**1**	**1**	**1**	**1**	**1**	**1**	To promote the most efficient use of a building's footprint by ensuring that land and material use is optimised across the development.	The building footprint calculations have been undertaken based on the drawings. The calculations confirm a building footprint of 1:2.8 has been targeted, therefore 1 credit can be predicted at this stage.
Sub total		**9**	**6**	**6**	**6**	**6**	**6**	**6**	1 Eco credit is worth (1.33%)	
Weighted sub total		**12.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**	**8.0**		

Summary	Total	Rating
Unit 1	69.46	**Level 4**

Summary	Total	Rating
Unit 2	68.87	**Level 4**

Summary	Total	Rating
Unit 3	68.43	**Level 4**

Summary	Total	Rating
Unit 4	68.43	**Level 4**

Summary	Total	Rating
Unit 5	68.43	**Level 4**

Summary	Total	Rating
Unit 6	70.43	**Level 4**

Total required for Level 1	36
Total required for Level 2	48
Total required for Level 3	57
Total required for Level 4	68
Total required for Level 5	84
Total required for Level 6	90

Limitations

URS Environment and Infrastructure UK Limited ("URS") has prepared this Report for the sole use of Peaceline Ltd ("Client") in accordance with the Agreement under which our services were performed GS/JC/Ken/01a. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken between May 2014 and July 2014 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Studies have not been undertaken, except where specifically referenced, to support this report. This includes but is not limited to Building Regulations, energy assessments, daylight calculations, NOx emission calculations, manufacturers and operators specification claims, ecology assessments, flood risk assessments, noise assessments, light pollution evaluation, job creation data, contaminated land assessments and transport assessments.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

Copyright